



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/567,144

02/06/2006

Aaron M. Gabelnick

63301A

9403

109 7590 04/03/2009

The Dow Chemical Company
Intellectual Property Section
P.O. Box 1967
Midland, MI 48641-1967

EXAMINER

MILLER, JR, JOSEPH ALBERT

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

04/03/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/567,144	Applicant(s) GABELNICK ET AL.	
	Examiner JOSEPH MILLER JR	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,7,8,10 and 11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7,8,10 and 11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/20/2009 has been entered.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3 and 5 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 6 and 13 of U.S. Patent No. 6,815,014 in view of Koinuma (EP 0617142 A1) and Hunt (2002/0058143).

Although the conflicting claims are not identical, they are not patentably distinct from each other because in each case a perforated electrode, the use of a tetraalkylorthosilicate, a balance gas including oxygen, a glow discharge/corona plasma and moving substrate are claimed in each. Additionally, the flow velocity ranges are overlapping, the silicon compound source concentration would be obvious to vary as a matter of perfecting a thin film. Patent '014 does not mention the specific gas PPM range as in instant claims or the use of air (etc) as a balance gas. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the range taught by Koinuma, 33 to 10000ppm TEOS, with the method taught in '014 because it provides a range where deposition rate would be sufficiently high without entering the range where silica particles join together to form a rough, porous film (page 3, lines 22-43). Hunt teaches the formation of a silicon dioxide film using TEOS with a carrier gas comprising oxygen [0119]. It would have been obvious to someone of ordinary skill in the art at the time of the invention to apply the use of oxygen as a carrier gas as taught by Hunt to the formation of a silicon dioxide film as taught by Koinuma as one could apply the use of the oxygen gas as a carrier gas (in lieu of a gas such as nitrogen as taught by Koinuma, p4, lines12-15)) with a reasonable expectation of success / as a known alternative in formation of a silicon dioxide film based on Hunt's successful use of oxygen as a carrier gas for TEOS.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 1 is rejected under 35 U.S.C. 103(a) as obvious over Koinuma (EP0617142A1) in view of Hunt (2002/0058143).

Koinuma teaches a method to form a silica thin film by establishing an atmospheric pressure glow discharge beam plasma using an inert gas and trimethoxysilane (abstract). Koinuma teaches a glow discharge plasma between two electrodes, a balancing gas (hydrogen), a carrier gas (argon), a substrate and a gas flow of 0.26 m/s (Example 1, page 4) based on a flame size of 5mm (page 3, line 24).

Koinuma discusses the volume of TEOS as compared to the carrier gas and hydrogen (page 3, lines 56 - page 4, line 11), teaching a main gas range of 200-300 sccm, and a range of silane compound source from 0.01 to 2 SCCM, the lower limitation of amount of silane source compound used being based on too low of a deposition rate and the upper on the point where silica particles join together and form a rough, porous film (col 3, lines 39-43). Calculating the silane precursor based on the extremes of the ranges taught by Koinuma, the silane source may be from 33 to 10,000 PPM. Calculation based on a silane compound source at 0.01 sccm with main gas at 300 sccm (lower limit ppm) up to silane source at 2 sccm with main gas at 200 sccm (upper limit ppm).

Regarding the limitation of a balance gas of an oxygen-containing compound as named in instant claim 1, Koinuma teaches that the reaction may occur in air (pg 4, lines 36-38) but does not specifically teach using a balance gas as described in instant claim 1.

Hunt teaches the formation of a silicon dioxide film using TEOS with a carrier gas comprising oxygen [0119].

It would have been obvious to someone of ordinary skill in the art at the time of the invention to apply the use of oxygen as a carrier gas as taught by Hunt to the formation of a silicon dioxide film as taught by Koinuma as one could apply the use of the oxygen gas as a carrier gas (in lieu of a gas such as nitrogen as taught by Koinuma, p4, lines12-15)) with a reasonable expectation of success / as a known alternative in formation of a silicon dioxide film based on Hunt's successful use of oxygen as a carrier gas for TEOS.

Regarding the limitation that the film has an optical clarity of at least 98% and a haze value of not greater than 2%, Koinuma teaches that the film is characterized by "transparency" (page 2, lines 43-46) but does not explicitly teach the claimed clarity/haze values. While Koinuma does not explicitly teach the result of an optical clarity of at least 98% and a haze value of not greater than 2%, however, since the prior art and the present claims teach all the same process steps, the results of optical clarity and haze value obtained by applicants process must necessarily be the same as those obtained by the prior art. Therefore by depositing a film using a TEOS precursor in the concentration range of about 3500 to about 10,000 ppm and oxygen as a balance gas, establishing an atmospheric pressure glow discharge plasma in a region between an electrode and counter electrode, it must necessarily result in the production of a film with an optical clarity of at least 98% and a haze value not greater than 2% by Koinuma in view of Hunt.

Claims 1-5, 7-8, 10 and 11 are rejected under 35 U.S.C. 103(a) as obvious over Gabelnick (WO 03/066932) in view of Koinuma (EP 0617142 A1).

Gabelnick teaches a process for creating plasma polymerized deposition on a substrate by corona discharge (abstract). Gabelnick teaches a plasma “in a spacing between the electrode and the counter electrode” (page 3, lines 10-15), flowing a mixture gas with a balance gas including oxygen (page 3, line 26 – page 4, line 3), where the mixture gas may include TEOS (page 4, lines 4-15) at a flow velocity of at least 0.1 m/s.

Gabelnick teaches a ppm “preferably” not greater than 2000 ppm, but does not explicitly teach the claimed concentration.

Koinuma teaches that the concentration of TEOS can range from 33 to 10000 ppm (as explained above) for a high deposition rate without entering the range where silica particles join together to form a rough, porous film (page 3, lines 22-43).

It would have been obvious to one of ordinary skill in the art at the time of the invention to any amount of TEOS up to 10000 ppm as taught by Koinuma because it provides a range where deposition rate would be sufficiently high without entering the range where silica particles join together to form a rough, porous film (pg 3, lines 22-43).

Regarding the claim limitation that the film clarity is greater than 98% and the haze value is less than 2%, Gabelnick teaches the production of a film preferably within this range of values of clarity and haze (page 7, lines 23-31). While the combination of Koinuma and Gabelnick teaches the increase of silane source compound which is not

within the preferred range of Gabelnick, Koinuma teaches by producing a film "characterized by transparency", it would be obvious to one combining the teachings of Koinuma and Gabelnick to target production of a film with claimed characteristics, being that Gabelnick teaches those as preferable targets. Moreover, the results, based on instant application, would be achievable. While Gabelnick in view of Koinuma does not explicitly teach the result of an optical clarity of at least 98% and a haze value of not greater than 2% when applying a TEOS concentration of more than 3,500 ppm, however, since the prior art and the present claims teach all the same process steps, the results of optical clarity and haze value obtained by applicants process must necessarily be the same as those obtained by the prior art. Therefore by depositing a film using a TEOS precursor in the concentration range of about 3500 to about 10,000 ppm and oxygen as a balance gas, establishing an atmospheric pressure glow discharge plasma in a region between an electrode and counter electrode, it must necessarily result in the production of a film with an optical clarity of at least 98% and a haze value not greater than 2% by Gabelnick in view of Koinuma.

Regarding claim 2, Gabelnick teaches perforations (slits) in the electrode (page 8, lines 24-30), the slits are electrode "outlets".

Regarding claim 3, Gabelnick claims a continuous process wherein the counter electrode supports a moving substrate (claim 10, page 11).

Regarding claim 4, Gabelnick teaches that the electrode may be covered with a dielectric sleeve (page 8, lines 21-23).

Regarding claim 5, Gabelnick teaches the use of TEOS (page 6, line 15).

Art Unit: 1792

Regarding claim 7, Gabelnick teaches use of atmospheric pressure (abstract).

Regarding claim 8, Gabelnick teaches the flow rate of the gas as at least 0.1 m/s (pg 6, lines 25-30), thereby teaching on claimed range.

Regarding claim 9, Gabelnick claims a continuous process (claim 10, page 11).

Regarding claim 10, Gabelnick teaches that the resulting film is "optically clear."

Regarding claim 11, Gabelnick teaches an example including a resulting surface energy of greater than 50 dynes/cm (page 8, lines 20-24).

While Gabelnick in view of Koinuma does not explicitly teach the result of a film with a surface energy of more than 50 dynes/cm **when** applying a TEOS concentration of more than 3,500 ppm, however, since the prior art and the present claims teach all the same process steps, the results of optical clarity and haze value obtained by applicants process must necessarily be the same as those obtained by the prior art. Therefore by depositing a film using a TEOS precursor in the concentration range of about 3500 to about 10,000 ppm and oxygen as a balance gas, establishing an atmospheric pressure glow discharge plasma in a region between an electrode and counter electrode, it must necessarily result in the production of a film with a surface energy of more than 50 dynes/cm by Gabelnick in view of Koinuma.

Claim 11 is rejected under 35 U.S.C. 103(a) as obvious over Koinuma (EP0617142A1) in view of Hunt (2002/0058143) as applied to claim 1 and in further view of Sloodman (5,576,076).

Koinuma teaches a glow discharge plasma between two electrodes, a balancing gas (hydrogen), a carrier gas (argon), a substrate and a gas flow of 0.26 m/s (Example 1, page 4) based on a flame size of 5mm (page 3, line 24).

Koinuma teaches a glow discharge plasma between two electrodes, a balancing gas (hydrogen), a carrier gas, a substrate and a gas flow of 0.26 m/s (Example 1, page 4. Koinuma teaches a TEOS range of 33 to 10,000 ppm. Hunt teaches the formation of a silicon dioxide film using TEOS with a carrier gas comprising oxygen [0119].

Koinuma in view of Hunt does not teach a result of the surface energy of the deposited film.

Slootman teaches a TEOS film deposited via an atmospheric glow discharge process, where the glow discharge is created using two electrodes, one which is dielectric-covered (col 1, lines 21-26; col 2, lines 48-56 and 59-65). Slootman teaches results of several experiments where the surface tension is greater than 58 dynes/cm. While the results presented by Slootman are not using the same starting precursor as taught by Koinuma, the results are indicative of the desired surface energy of such work and one may expect similar results from various sources of silicon (which are taught by Koinuma). It therefore would have been obvious to try the same experiment as taught by Koinuma in view of Slootman and determine the surface energy.

Response to Arguments

Applicant has overcome double patenting rejection in view of Babayan with the amendment of claim 1; however the double patenting rejection in further view of Koinuma and Hunt is being held.

Applicant's arguments, see Applicant Arguments, filed 03/20/2009, with respect to the rejection(s) of claim(s) 1, 2, 5-7 and 11 under USC 102 and 103 in view of Babayan have been fully considered and are persuasive in light of applicant's amendment of claim 1. Therefore, the rejection has been withdrawn.

Applicant's arguments over the rejection of claims over Koinuma in view of Hunt have been fully considered but they are not persuasive. Applicant argues that Koinuma/Hunt "do not teach or suggest the instant lower limit of TEOS concentration" as claimed, however, Koinuma teaches the range of 33 to 10,000 PPM, which encompasses that lower limit. Regarding applicant arguments concerning the film clarity, as noted in the office action, Koinuma teaches a film "characterized by clarity". Though Koinuma does not specifically teach the level of clarity, because the steps taught in the prior art and instant application are the same, the results of the levels of clarity and haze must necessarily be the same (as described above). Applicant argues that prior art "method would need to be significantly modified in order to arrive at the instant combination of process limitations and ingredients that produces the instant optically clear film coating", however, based upon the instant disclosed process, it is not clear (from instant specification) exactly what steps, beyond routine process optimization, would need to be performed in order to produce the claimed filmed clarity.

Applicant's amendments have overcome the 103 rejection over Gabelnick.

Applicant's arguments over the rejection of Gabelnick in view of Koinuma have been fully considered but they are not persuasive. The rejection of claims 7 and 9 were in fact not applied based upon their rejection over other pieces of prior art, without the implication that they can not be applied. Each Koinuma and Gabelnick teach optically clear films as described; one would apply the teachings of Koinuma to those of Gabelnick in order to produce films with a higher deposition rate.

Regarding rejection of claims 2-4 and also claim 11 under U.S.C. 103 over Koinuma in view of Hunt and further view of Yializis and Sloodman, respectively, the rejection of claim 1 has been modified per the amendment and the rejections are still applied. Applicants make no arguments over the applicability of Yializis or Sloodman to Koinuma in view of Hunt.

Regarding the rejection of claims 1-5, 7 and 8, Examiner is not applying the rejection of Yializis in view of Koinuma, though the rejection may be applicable, the other rejections made are more obvious in light of applicant amendments because Yializis does not teach the formation of a clear film, though teaching many aspects of the instant application.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSEPH MILLER JR whose telephone number is (571) 270-5825. The examiner can normally be reached Mon - Fri, 7am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/JOSEPH MILLER JR/
Examiner, Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792